

**REMARKS**

Claims 12-27 are pending in the present application. Claims 12 and 20 are amended to clarify that the recited pointed metal tips are electrodes and part of a thermoelectric device. The amendment seeks to achieve this end by removing the language of purpose or intended use, and replacing that language with "pointed metal tips of a thermoelectric device...." This language is intended as a distinct definition of a limitation of the claimed invention. Reconsideration of the claims is respectfully requested.

**I. Phone Interview with Examiner Kielin, 9.16.03**

Applicant respectfully refers Examiner Kielin to the telephone interview conducted on 9.16.03, wherein Applicant and Examiner discussed the merits of combining the Nishiwaka reference with the Hashimoto reference. Applicant stated that Nishiwaka was directed to a machine size thermoclectric (TE) device (with size scales in the millimeters) while Hashimoto was directed to creation of a metal file on the semiconductor processing size scale (several orders of magnitude smaller than the device of Nishiwaka). Applicant submitted that since Nishiwaka was directed to a TE device and Hashimoto was directed to a metal file (of different size scales), it would not be obvious for one of ordinary skill in the art who looked to Nishiwaka for teaching on a TE device to also look to the teaching of Hashimoto for further teaching about a TE device, particularly since Hashimoto is directed to creation of a file and not directed to a TE device. Examiner acknowledged the merits of this argument, but withheld judgment until Applicant submitted a reply to the office action.

**II. 35 U.S.C. § 112, Second Paragraph**

The examiner has rejected claims 12-27 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter, which applicants regard as the invention. This rejection is respectfully traversed.

Examiner states in the office action,

Line 5 of each of claims 12 and 20 recites the limitation, "pointed tipped structures of metal." It is unclear whether this metal is the same metal as the "metal layer" or if it is a different metal.

Applicant respectfully submits that the claims are not indefinite in their current form. The claims recite that the "substantially pointed tipped structures of metal" are produced by "etching the layer of metal in the presence of the photoresist mask...." The process of etching the metal layer creates pointed metal structures. It is respectfully submitted that one of ordinary skill in the art would not find these claims unclear.

Particularly, the relevant claims recite, "etching the layer of metal...to produce substantially pointed structures of metal...." One of ordinary skill in the art would understand that the pointed structures of metal are formed from the metal of the metal layer, since the step of "etching the layer of metal" is used "to produce substantially pointed tipped structures of metal...." [Emphasis added.]

Further, claim 15 recites "a layer of a second metal." This claim differentiates claim 12 by reciting a "second" metal. Hence, claim 12 involves a first metal, while claim 15 adds a second metal. By looking at both claims, it would be clear to one of ordinary skill in the art that claim 12's "pointed tipped structures of metal" are formed from "the layer of metal" by etching that layer of metal, as recited.

The above arguments are believed to equally apply to claim 20, which is rejected under the same rationale as claim 12.

Therefore the rejection of claims 12-27 under 35 U.S.C. § 112, second paragraph is believed overcome.

### III. 35 U.S.C. § 102, Anticipation

The examiner has rejected claims 12, 13, 18, 20, 21, and 26 under 35 U.S.C. § 102 as being anticipated by Hashimoto. This rejection is respectfully traversed.

In rejecting the claims, Examiner states:

Regarding claims 12 and 20, Hashimoto discloses a method of and system for forming pointed metal tips comprising:

forming a mask of patterned photoresist 4 onto a layer of metal 1 wherein the photoresist forms an array of photoresist areas that correspond to areas for which tips of the substantially pointed tip structure of the metal are desired -- as further limited by instant claims 13 and 21;

etching the layer of metal 1 in the presence of the photoresist mask 4 to produce substantially pointed tipped metal structures of metal 6 wherein the structures are "needle-like" and therefore conical-shaped -- as further limited by instant claims 18 and 26; and

removing the photoresist. (See Abstract and Figs. 1-6.)

The limitation "for use in a thermoelectric device" does not have patentable weight in the claim as presently written because it is in the preamble and only indicates the intended use of the metal tips.

Claim 12 is reproduced for reference:

12. A method of forming metal electrode pointed tips of a thermoelectric device, the method comprising:
  - forming a mask of patterned photoresist onto a layer of metal;
  - etching the layer of metal in the presence of the photoresist mask to produce substantially pointed tipped structures of metal; and
  - removing the photoresist.

Examiner cites Hashimoto as teaching the recited claim elements. However, Applicant respectfully submits that Hashimoto fails to teach the claimed limitations for at least three reasons. First, Hashimoto does not recite that pointed metal tips are part of a TE device. Hence, Hashimoto does not teach all claimed limitations of claim 12, particularly, "metal pointed tips of a thermoelectric device..." as claimed.

Second, Hashimoto is directed to fabrication of a metal file. The English language abstract of Hashimoto states,

Purpose: to obtain files of various fineness finer than the conventional files by the procedure in which a resist picture is formed to form the projections of file on a metal plate....

Hence, it is respectfully submitted that one of ordinary skill in the art would not be motivated to look to the field of file manufacturing for teaching on thermoelectric devices.

Finally, it is respectfully submitted that the teaching of Hashimoto would need to be substantially modified in order to teach all limitations of the claimed invention. For

example, the present claim 12 recites metal electrode pointed tips of a thermoelectric device. For Hashimoto to teach this, the reference must be significantly modified. For example, the production of a metal file would need to be modified into that of a thermoelectric device, which includes other parts that are not necessary in production of a file, such as contacts, insulating layers, etc. Also, Hashimoto's file manufacturing does not require placement of electrodes on the file, as claimed.

Hence, it is respectfully submitted that the present claims are distinguished from the cited reference. Reconsideration of the claims is respectfully requested.

The examiner has rejected claims 12, 13, 20, and 21 under 35 U.S.C. § 102 as being anticipated by JP 10-146799. This rejection is respectfully traversed.

Applicant respectfully submits that JP 10-146799 fails to teach the limitations of at least claims 12 and 20 for the same reasons stated in reference to Hashimoto, above. For example, JP 10-146799 is directed to the fabrication of a cutting die:

The process involves forming multiple first resist patterns...After performing a second etch process, with respect to the second resist patterns, a cutting die (10) is made from the metal plate.

[JP 10-146799, Abstract, emphasis added.]

Thus, JP 10-146799 fails for the same reasons as Hashimoto--the recited structure is not part of a TE device (a limitation not present in JP 10-146799), and the art of making a cutting die is not analogous to that of fabricating a TE device. The teaching of JP 10-146799 would require significant modification to form a TE device from its teaching. Further, the recited metal electrode of claim 12 as amended is not shown in the cited reference.

Therefore, it is respectfully submitted that the JP 10-146799 reference does not teach the claimed limitations of claims 12, 13, 20, and 21. Reconsideration of the claims is respectfully requested.

The examiner has rejected claims 12-15, 18, 20-23, and 26 under 35 U.S.C. § 102 as being anticipated by Shibata. This rejection is respectfully traversed.

As argued above, Shibata does not teach the fabrication of pointed metal tips of a thermoelectric device. For the reasons argued above with respect to Hashimoto and JP 10-146799, it is respectfully submitted that Shibata fails to teach all limitations of the claimed invention. For example, Shibata appears to teach a pointed structure for use in a transistor, as depicted on p. 281 of the version including the English language abstract. The teaching of Shibata therefore would require modification not taught or suggested in Shibata in order to reach the claimed invention.

Finally, with respect to rejection under 102 of the claims, with respect to Hashimoto, JP 10-146799, and Shibata, it is respectfully submitted that the claims as amended include the limitation, "A method of forming metal pointed tips of a thermoelectric device...." This limitation is not present in any of the three cited references. A prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 32 U.S.P.Q.2d 1031, 1034 (Fed. Cir. 1994). Anticipation focuses on whether a claim reads on the product or process a prior art reference discloses, not on what the reference broadly teaches. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983).

For the above reasons, it is respectfully submitted that all rejections of the claims under 102(b) are overcome. Favorable reconsideration of the claims is respectfully requested.

#### IV. 35 U.S.C. § 103, Obviousness

The examiner has rejected claims 12-27 under 35 U.S.C. § 103 as being unpatentable over Nishiwaka in view of Hashimoto. This rejection is respectfully traversed.

Applicant respectfully submits that the two references are from non-analogous art, and that one of ordinary skill in the art would not be motivated to combine the two references to reach the present claimed invention.

Non-analogous art cannot be used to establish obviousness. *In re Pagliaro*, 210 U.S.P.Q. 888, 892 (C.C.P.A. 1981). Although one of ordinary skill in the art is presumed to be aware of all prior art in the field to which the claimed invention pertains, he or she is not presumed to be aware of prior art outside of that field and the field of the problem to be solved; i.e., analogous art. The presently claimed invention is directed towards the field of thermoelectric device fabrication, while Hashimoto is directed towards the field of file manufacturing.

Further, the Hashimoto and Nishiwaka references are not from analogous fields. Nishiwaka is directed to fabrication of a TE device, not a file.

The device of Nishiwaka is also not of the same scale (in size) as the present invention or of Hashimoto. Though miniaturization itself may not be considered novel by the Examiner, the difference in size scales (Nishiwaka deals with devices made by machining and of millimeter size scale, while Hashimoto uses semiconductor processing technology and is orders of magnitude smaller) would make it unlikely for one of ordinary skill in the art to look to Hashimoto for direction in how to modify Nishiwaka to make a better TE device. For example, Nishiwaka teaches making a TE device using machining, creating a device millimeters in size. The Hashimoto reference teaches to make a metal file using technology that makes features at a micrometer or nanometer scale. Applicant respectfully submits that the combination of different fields (TE device v. metal file) and different scales (Nishiwaka's device is hundreds or thousands of times larger than Hashimoto's device) makes it unlikely that one of ordinary skill in the art would be motivated to combine the two references as Examiner suggests.

Further, there is no teaching or suggestion in either reference that would motivate one of ordinary skill in the art to combine the two cited references.

Therefore, it is respectfully submitted that Nishiwaka and Hashimoto are non-analogous art and cannot be used to form a *prima facie* case of obviousness.

Therefore, the rejection of claims 12-27 under 35 U.S.C. § 103 is believed overcome.

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V. Conclusion

It is respectfully urged that the subject application is patentable over the cited references and is now in condition for allowance.

The examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,



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